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E

mod. IO-CB/AI-04RT-00

M.U. IO-CB/AI-04RT-3/11.05
Cod. J30-478-1AAI-04RT E

User manual

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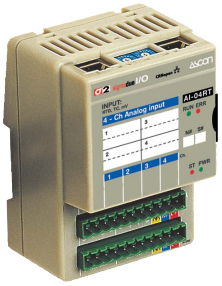
CANopen I/O Module 4 Configurable Analogue Inputs mod. IO-CB/AI-04RT

O2 SERIES

4 inputs configurable for:
TC, RTD or mV



Applicable standards

The AI-04RT module is suited for the CiA DS301 protocol [1] and implements the CiA DS 401 standard Device Profile, as far as the Analogue Input Function Block is concerned [2].

Warning

1) **The product described in this manual should only be installed, operated and maintained by qualified application programmers and software engineers who are familiar with automation safety concepts and applicable national standards.**
2) **This product supports the Parameter defaults indicated by CiA standards, in addition, some parameters have a factory set (value present in the module when comes from the factory). The default values can be loaded with the restore command, but after the restore, factory set values are lost.**

Characteristics

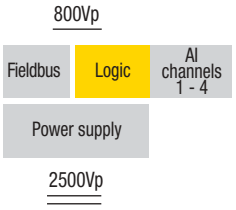
Technical data

Accuracy at 25°C	±0.05% FS
Temperature coefficient	0.005% FS/K
Input impedance (mV)	> 100MΩ
Digital resolution	16 bit
Data format	Binary Integer
Input types	J, K, L, N, R, S, T
Input range	±50 mV ±300 mV ±1000 mV
Total input system transfer time	100 ms
Conversion method	Sigma delta
Overvoltage protection	30 V
CMRR	> 100 dB

General

3 way isolation	800 Vp
Power supply	24 Vdc; –15...+25%
Power consuption	3 W
Dimensions	L: 76; H: 110; W: 65
Weight	220 g
Safety regulations EN61010-1	**Isolation class II** (50 Vrms) Installation cathegory II Pollution degree 2
CE marking	EN61131-2

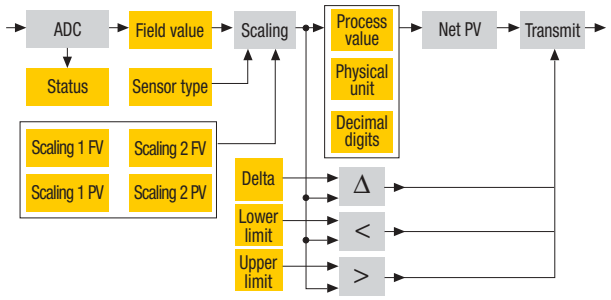
3 way isolation diagram



Environment

	Operating	Storage
Temperature	-10...+65°C	-40...+85°C
Relative Humidity	5...95% non condensing Appropriate measures must be taken against humidity >85%	5...95% non condensing For a short period, slight condensation may appear on the housing
Mounting	Vertical, free air	
Protection	IP20	
Vibrations (3 axes)	10...57Hz 0.0375mm 57...150Hz 0.5g	
Shock (3 axes)	15g, 11ms half sine	

Functional Block Diagram



The analogue input function block describes, for each input channel, how field values are converted to process values. The field values are converted to the real physical dimension of the measured quantity, and the result is called "Process Value". The conversion from Field Value to Process Value is generally described as a linear transformation.

This is defined by two pairs of field values and corresponding process values (Input Scaling 1 FV/Input Scaling 1 PV and Input Scaling 2 FV/Input Scaling 2 PV), called calibration point 1 and 2.

Non-linear transformation (e.g. for thermocouples and PT100 sensors) is possible, and is defined within the parameter "Sensor Type". In this case the input scaling values are meaningless.

The calibration characteristic can be shifted by an additional "input offset" value.

Writing "1" on autozero will enable the zero offset value to be set so that the instantaneous measured “process value” becomes zero. The tare-zero value works like the zero offset value, but results in an additional "net process value". Writing "1" on autotare will enable the tare zero value to be set so that the instantaneous measured “net process value” becomes zero. The parameters "Span Start" and "Span End" define the process value validity range. If the process value exceeds these limits it will be marked as "overflowed".

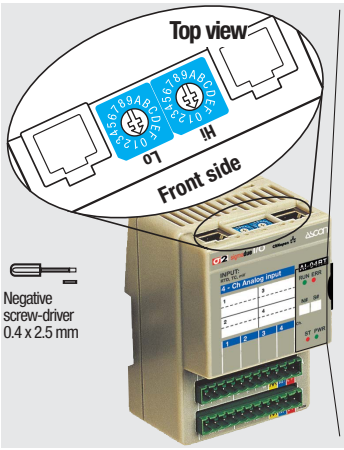
PDOs used by the module

TPDO	Properties	Mapped objects	Index	Sub-index
TPDO 1	COBID: 180h + NodeID	NetPV1	9140h	01h
	Transmission Type: 01h *	AI Operating mode1	6112h	01h
TPDO 2	COBID: 280h + NodeID	NetPV2	9140h	02h
	Transmission Type: 01h *	AI Operating mode2	6112h	02h
TPDO 3	COBID: 380h + NodeID	NetPV3	9140h	03h
	Transmission Type: 01h *	AI Operating mode3	6112h	03h
TPDO 4	COBID: 480h + NodeID	NetPV4	9140h	04h
	Transmission Type: 01h *	AI Operating mode4	6112h	04h

Note: * The Transmission Type is configurable:
01h is the factory set (value present in the modules when come from the factory);
FFh is the default value.

Hardware Set-up

Hexadecimal rotary switches, service and I/O LEDs



LED	Status	Meaning
RUN	ON	Operational
	Blinking	Pre-operational (CANopen)
	Single flash	STOPPED
	OFF	Device in RESET state
ERR	ON	BUS OFF
	Single flash	Warning limit reached
	Double flash	Error Control Event
	Triple flash	Sync Error (CANopen)
	OFF	No error. Device working
ST	ON	DIAG Error
	Blinking	INIT and DIAG running
	Single flash	Baud rate setting
	OFF	Module OK and ready
PWR	ON	Module Power Supply ON
	OFF	Module Power Supply OFF

Bit Rate and Node ID configuration

Bit rate

Lo switch	Baud rate kbps	Bus length m
1	20	2500
2	50	1000
3	100	500
4	125	500
5	250	250
6 *	500	100
7	800	50
8	1000	25

Node ID

Hi switch	Lo switch	Valid ID Node
0	1	01h (address 1)
0	2	02h (address 2)
↓	↓	↓
7	F *	7Fh (address 127D)

Notes: * Default value

Procedure for Node ID and Bit Rate configuration

The HI and LO hexadecimal rotary swithches set the module's Bit Rate and CAN Node ID. During the configuration, the module must be **off line** and the CAN bus must be physically disconnected.

To configure the module, follow the procedure:

1 Turn the Power OFF
2 Set the **HI** switch to "F"
3 Select the desired Bit Rate value by setting the **LO** switch following the table (e.g. "8" for 1 Mbps)
4 Turn the Power ON
5 Shift the **HI** switch to "E" (all the module service LEDs should flash)
6 Turn the Power OFF. Now configure Node ID
7 Set the **HI** and **LO** switches to the desired valid Node ID following the table
8 Turn the Power ON.

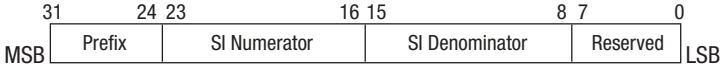
Alternatively, at step 7 set the value 00h. Then, at the next Power ON, the last valid stored value will be resumed as Node ID.

Default values: Bit Rate = 500 kbps, Node ID = 127D

Parameter configuration

Index 6110h - AI Sensor type
Index 6131h - AI Physical Unit PV
Index 6132h - AI Decimal Digits PV

The AI Physical Unit PV assigns SI units and prefixes to the process value, with the following structure:



Physical units and prefixes are coded according to CiA standard [3]. Within the DS404 profile, some additional physical units are specified:

Code	Physical unit	Code	Physical unit
55h	m/s	A3h	mmHg
56h	Nm	A4h	atm
A1h	at	ABh	PSI
A2h	mmH^2O	ACh	°F

Value	Sensor type	Decimal digits
TCJ	0x01	2
TCK	0x02	2
TCL	0x03	2
TCN	0x04	2
TCR	0x05	2
TCS	0x06	2
TCT	0x07	2

Value	Sensor type	Decimal digits
PT100 3 wires *	0x1E	2
PT1000 2 wires	0x21	2
PT100 2 wires	0x24	2
±1 V	0x2B	3
±50 mV	0x2710	3
±300 mV	0x2711	3

(Sub-Index 1 → channel 1, Sub-Index 2 → channel 2, Sub-Index 3 → channel 3, Sub-Index 4 → channel 4).

*] Default value

Module specific parameters

Index 2000h – Cold Junction Measure
Temperature of the cold junction, measured on the module's terminal block. Available through TPD04.

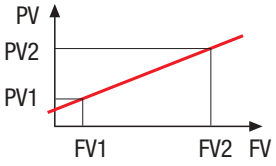
Index 3000h – Node Address
Current Module Node ID - Read only access

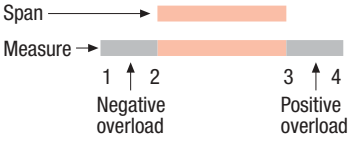
Index 3001h – Baudrate
Current Module Bit rate - Read only access

Scaling input variables

Index 9120h – AI Input Scaling 1FV
Index 9121h – AI Input Scaling 1PV
Index 9122h – AI Input Scaling 2FV
Index 9123h – AI Input Scaling 2PV

As regards linear inputs, the above variables allow the scale of the physical input to be changed and the desired physical unit to be assigned to this input. In addition, an offset can be added.





Index 9148h – AI Span start
Index 9149h – AI Span end

These two variables take into account the validity of the span values, indicating possible overloads and limiting the measure in correspondence of the extreme points of the span.

Span programmed values (°C)

Input	Span Start	Span End
TCJ	-210°C	1200°C
TCK	-200°C	1372°C
TCL	-200°C	600°C
TCN	0°C	1300°C
TCR	0°C	1600°C
TCS	0°C	1760°C
TCT	-200°C	400°C

Input	LO Range	HI Range	Span Start	Span End
PT100	-	-	-200°C	600°C
PT1000	-	-	-200°C	600°C
±1 V	-1.28 V	1.28 V	-1 V	+1 V
±50 mV	-80 mV	80 mV	-50 mV	+50 mV
±300 mV	-320 mV	320 mV	-700	+300

Index 6150h – AI Status

bit 7 – 3	2	1	0
Reserved	Negative overload	Positive overload	Not valid (e.g. sensor break)

Index 6F20h – Life Counter

A counter that increments at each new generated sample.

Index 9143h – AI Interrupt Delta NetPV

Index 9144h – AI Interrupt Lower Limit Net PV

Index 9145h – AI Interrupt Upper Limit Net PV

The last the variables relate to the asynchronous mode of transmission of a PDO (transmission type 255). A comparison is made with the mapped Net PV value and a transmission is initiated asynchronously when any of the limits is reached.

Parameter Store/Restore

This module allows parameters to be saved in a non volatile memory. In order to avoid storing parameters by mistake, storage is only executed when a specific signature is written to the appropriate subindex. The signature is "save".

Similarly, the default values of parameters, according to the communication or device profile, are restored. On receipt of the correct signature in the appropriate subindex, the device restores the default parameters and then confirms the SDO transmission. The signature is "load".

The new configuration becomes active after a reset, i.e. after a "Power Down" or an NMT "Reset Node" message.

Byte	0	1	2	3	4	5	6	7
Store Parameter	22h	10h	10h	01h	73h	61h	76h	65h
					s	a	v	e
	COB – ID = 600h + NodeID							
Restore Parameter	22h	11h	10h	01h	6Ch	6Fh	61h	64h
					l	o	a	d
	COB – ID = 600h + NodeID							

Commands

Index 6112h – AI Operating Mode

Determines the operating state of the four input channels according to the following values:

00h	Initialising
01h	Operating (default)

SDO Messages

The entries of a device Object Dictionary are accessed trough SDO (Service Data Object) messages. The basic SDO messages are as follows, as based on the Client – Server request and response model:

Byte	0	1	2	3	4	5	6	7
Read request	40h	Index		Sub-Index	Reserved			
	COB – ID = 600h + NodeID							
Read response	4xh *	Index		Sub-Index	Data			
	COB – ID = 580h + NodeID							
Write request	22h	Index		Sub-Index	Data			
	COB – ID = 600h + NodeID							
Write response	60h	Index		Sub-Index	Reserved			
	COB – ID = 580h + NodeID							

* This code is type dependant.
Please refer to the CIA DS301 Profile for more details.

Emergency messages

The module automatically sends emergency messages including error codes. The communication errors are descrided in CiA DS301 [1].
The error codes are expressed as a DEVICE SPECIFIC ERROR type of code, one for each channel: 0xFF0n for channel n. The codes indicating a specific condition are also inserted, following the table below:

Error code	Error
0000000000	**No error** –This code is generated when exiting an error contidion, to notify the end of one of the error states
0000000001	**Error No Valid Calib** – An attempt to change the state of an input channel not properly calibrated to "operating"
0000000002	**Error No Config** – An attempt to change the state of an input channel with a non valid Sensor Type to "operating"
0000000006	**Error No Command** – Invalid command received
0000000007	**Error Wrong Command** – An attempt to execute a command from an illegal state
0000000008	**Error Wrong Assignment** – An attempt to assign a parameter from an illegal state

	0	1	2	3	4	5	6	7
Emergency message	0nh	FFh	21h	00h	00h	00h	0Eh	00h
	COB – ID = [entry 1014h] + NodeID							
				Error code				

Reference documents

List of CiA documents to which the user should refer:
[1] CiA DS301 - CANopen Application Layer and Communication Profile
[2] CiA DS404 - CANopen Device Profile: Measuring Devices and Closed-Loop Controllers
[3] CiA DRP303-2 – Representation of SI Units and Prefixes

Accessories, Spare Parts and Warranty

Power Supply 45W 24Vdc 2A	AP-S2/AL-DR45-24
Power Supply 120W 24Vdc 5A	AP-S2/AL-DR120-24
Additional Terminal Block 2x11	AP-S2/TB-211-1
Female Plug 11 Screw clamp	AP-S2/SPINA-V11
Female Plug 11 Spring clamp	AP-S2/SPINA-M11
RJ45 terminated cable 14cm	AP-S2/LOCAL-BUS76
RJ45 terminated cable 22cm	AP-S2/LOCAL-BUS152
CAN termination Adapter	AP-S2/TERM-CAN

Warranty: 3 years excluding defects due to improper use

Object Dictionary structure (with default values)

⚠ In order to configure the module, it is necessary to connect it to a PC with the CAN interface and the superivisory software installed. The configuration can be obtained by writing the desired values to the module's variables listed in the Object Dictionary.

Index (hex)	Sub Index	Object	Name	Default [hex]	Type	Acc. Attr.	MO
1000		VAR	Device Type	20194	UNSIGNED32	RO	M
1001		VAR	Error Register	0	UNSIGNED8	RO	M
1003		ARRAY	Predefined error field	0	UNSIGNED32	RO	O
1005		VAR	COB-ID SYNC	80	UNSIGNED32	RW	O
1006		VAR	Communication cycle period	0	UNSIGNED32	RW	O
1007		VAR	Synchrounous window length	0	UNSIGNED32	RW	O
1008		VAR	Manufacturer Device Name	"04RT"	Vis-String	const	O
1009		VAR	Manufacturer Hardware Version	"0100"	Vis-String	const	O
100A		VAR	Manufacturer Software Version	"0100"	Vis-String	const	O
100C		VAR	Guard Time	0	UNSIGNED16	RW	O
100D		VAR	Life Time Factor	0	UNSIGNED8	RW	O
1010		ARRAY	Store Parameters		UNSIGNED32		O
	00h	VAR	Largest subindex supported	1	UNSIGNED8	RO	
	01h	VAR	Save all parameters	3	UNSIGNED32	RW	
1011		ARRAY	Restore Default Parameters		UNSIGNED32	RW	O
	00h	VAR	Largest subindex supported	1	UNSIGNED8	RO	
	01h	VAR	Restore all default parameters	1	UNSIGNED32	RW	
1014		VAR	COB-ID EMCY	80 + NodeID	UNSIGNED32	RW	O
1015		VAR	Inhibit Time EMCY	000	UNSIGNED16	RW	O
1017		VAR	Producer heartbeat time	07D0	UNSIGNED16	RW	O
1018		RECORD	Identity Object		Identity (23h)		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	Vendor ID	000000E9	UNSIGNED32	RO	
1200		RECORD	Server SDO parameter		SDO Parameter (22h)		O
	00h	VAR	Number of entries	2	UNSIGNED8	RO	
	01h	VAR	COB-ID Client -> Server (rx)	600 + NodeID	UNSIGNED32	RO	
	02h	VAR	COB-ID Server –> Client (tx)	580 + NodeID	UNSIGNED32	RO	
1800		RECORD	1st Transmit PDO Comm Param.		PDO CommPar (20h)		M
	00H	VAR	Largest subindex supported	5	UNSIGNED8	RO	
	01h	VAR	COB-ID used	180 + NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0	UNSIGNED16	RW	
1801		RECORD	2nd Transmit PDO Comm Param.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	5	UNSIGNED8	RO	
	01h	VAR	COB-ID used	280 + NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0	UNSIGNED16	RW	
1802		RECORD	3th Transmit PDO Comm Param.		PDO CommPar (20h)		M
	00h	VAR	Largest s ubindex supported	5	UNSIGNED8	RO	
	01h	VAR	COB-ID used	380 + NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0	UNSIGNED16	RW	
1803		RECORD	4th Transmit PDO Comm Param.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	5	UNSIGNED8	RO	
	01h	VAR	COB-ID used	480 + NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0	UNSIGNED16	RW	
1A00		RECORD	1st Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	2	UNSIGNED8	RO	
	01h	VAR	Net PV1	91400120	UNSIGNED32	RO	
	02h	VAR	AI Operating Mode 1	61120108	UNSIGNED32	RO	
1A01		RECORD	2ndTransmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	2	UNSIGNED8	RO	
	01h	VAR	Net PV2	91400220	UNSIGNED32	RO	
	02h	VAR	AI Operating Mode 2	61120208	UNSIGNED32	RO	
1A02		RECORD	3th Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	2	UNSIGNED8	RO	
	01h	VAR	Net PV3	91400320	UNSIGNED32	RO	
	02h	VAR	AI Operating Mode 3	61120308	UNSIGNED32	RO	
1A03		RECORD	4th Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	2	UNSIGNED8	RO	
	01h	VAR	Net PV4	91400420	UNSIGNED32	RO	
	02h	VAR	AI Operating Mode 4	61120408	UNSIGNED32	RO	
2000		ARRAY	Cold Junction Temperature		INTEGER16		O
	00h	VAR	Number of entries	1	UNSIGNED8	RO	
	01h	VAR	Cold Junction Measure			RO	
2001		VAR	50/60 Hz Input Filter	00	UNSIGNED8	RW	O
3000		VAR	Node Address	7F	UNSIGNED8	RO	O
3001		VAR	Node Baurate	06	UNSIGNED8	RO	O
3500		ARRAY	Out of Range mode		UNSIGNED8		C
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	Ch1 Out of Range mode	0	UNSIGNED8	RW	
	02h	VAR	Ch2 Out of Range mode	0	UNSIGNED8	RW	
	03h	VAR	Ch3 Out of Range mode	0	UNSIGNED8	RW	
	04h	VAR	Ch4 Out of Range mode	0	UNSIGNED8	RW	
6110		ARRAY	AI Sensor Type		UNSIGNED16		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Sensor Type ch1	1E	UNSIGNED16	RW	
	02h	VAR	AI Sensor Type ch2	1E	UNSIGNED16	RW	
	03h	VAR	AI Sensor Type ch3	1E	UNSIGNED16	RW	
	04h	VAR	AI Sensor Type ch4	1E	UNSIGNED16	RW	
6112		ARRAY	AI Operating Mode		UNSIGNED8		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Operating Mode ch1	0	UNSIGNED8	RW	
	02h	VAR	AI Operating Mode ch2	0	UNSIGNED8	RW	
	03h	VAR	AI Operating Mode ch3	0	UNSIGNED8	RW	
	04h	VAR	AI Operating Mode ch4	0	UNSIGNED8	RW	
6131		ARRAY	AI Physical Unit PV		UNSIGNED32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Physical Unit PV ch1	002D0000	UNSIGNED32	RW	
	02h	VAR	AI Physical Unit PV ch2	002D0000	UNSIGNED32	RW	
	03h	VAR	AI Physical Unit PV ch3	002D0000	UNSIGNED32	RW	
	04h	VAR	AI Physical Unit PV ch4	002D0000	UNSIGNED32	RW	
6132		ARRAY	AI Decimal Digits PV		UNSIGNED8		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Decimal Digits PV ch1	2	UNSIGNED8	RW	
	02h	VAR	AI Decimal Digits PV ch2	2	UNSIGNED8	RW	
	03h	VAR	AI Decimal Digits PV ch3	2	UNSIGNED8	RW	
	04h	VAR	AI Decimal Digits PV ch4	2	UNSIGNED8	RW	
6150		ARRAY	AI Status				O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Status ch1	0	UNSIGNED8	RO	
	02h	VAR	AI Status ch2	0	UNSIGNED8	RO	
	03h	VAR	AI Status ch3	0	UNSIGNED8	RO	
	04h	VAR	AI Status ch4	0	UNSIGNED8	RO	
6F20		ARRAY	Life Counter		UNSIGNED8		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	Life Counter ch1	0	UNSIGNED8	RO	
	02h	VAR	Life Counter ch2	0	UNSIGNED8	RO	
	03h	VAR	Life Counter ch3	0	UNSIGNED8	RO	
	04h	VAR	Life Counter ch4	0	UNSIGNED8	RO	
9100		ARRAY	AI Input FV		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Input FV ch1		INTEGER32	RO	
	02h	VAR	AI Input FV ch2		INTEGER32	RO	
	03h	VAR	AI Input FV ch3		INTEGER32	RO	
	04h	VAR	AI Input FV ch4		INTEGER32	RO	
9120		ARRAY	AI Input Scaling 1 FV		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Input Scaling 1 FV ch1	0	INTEGER32	RW	
	02h	VAR	AI Input Scaling 1 FV ch2	0	INTEGER32	RW	
	03h	VAR	AI Input Scaling 1 FV ch3	0	INTEGER32	RW	
	04h	VAR	AI Input Scaling 1 FV ch4	0	INTEGER32	RW	
9121		ARRAY	AI Input Scaling 1 PV		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Input Scaling 1 PV ch1	0	INTEGER32	RW	
	02h	VAR	AI Input Scaling 1 PV ch2	0	INTEGER32	RW	
	03h	VAR	AI Input Scaling 1 PV ch3	0	INTEGER32	RW	
	04h	VAR	AI Input Scaling 1 PV ch4	0	INTEGER32	RW	
9122		ARRAY	AI Input Scaling 2 FV		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Input Scaling 2 FV ch1	FFFFFFFF	INTEGER32	RW	
	02h	VAR	AI Input Scaling 2 FV ch2	FFFFFFFF	INTEGER32	RW	
	03h	VAR	AI Input Scaling 2 FV ch3	FFFFFFFF	INTEGER32	RW	
	04h	VAR	AI Input Scaling 2 FV ch4	FFFFFFFF	INTEGER32	RW	
9123		ARRAY	AI Input Scaling 2 PV		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Input Scaling 2 PV ch1	FFFFFFFF	INTEGER32	RW	
	02h	VAR	AI Input Scaling 2 PV ch2	FFFFFFFF	INTEGER32	RW	
	03h	VAR	AI Input Scaling 2 PV ch3	FFFFFFFF	INTEGER32	RW	
	04h	VAR	AI Input Scaling 2 PV ch4	FFFFFFFF	INTEGER32	RW	
9130		ARRAY	AI input PV		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI input PV ch1		INTEGER32	RO	
	02h	VAR	AI input PV ch2		INTEGER32	RO	
	03h	VAR	AI input PV ch3		INTEGER32	RO	
	04h	VAR	AI input PV ch4		INTEGER32	RO	
9140		ARRAY	AI Net PV		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Net PV ch1		INTEGER32	RO	
	02h	VAR	AI Net PV ch2		INTEGER32	RO	
	03h	VAR	AI Net PV ch3		INTEGER32	RO	
	04h	VAR	AI Net PV ch4		INTEGER32	RO	
9143		ARRAY	AI Interrupt Delta Net PV		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Delta Net PV ch1	1	INTEGER32	RW	
	02h	VAR	AI Interrupt Delta Net PV ch2	1	INTEGER32	RW	
	03h	VAR	AI Interrupt Delta Net PV ch3	1	INTEGER32	RW	
	04h	VAR	AI Interrupt Delta Net PV ch4	1	INTEGER32	RW	
9144		ARRAY	AI Interrupt Lower Limit Net PV		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Lower Limit Net PV ch1	FFFFADF8	INTEGER32	RW	
	02h	VAR	AI Interrupt Lower Limit Net PV ch2	FFFFADF8	INTEGER32	RW	
	03h	VAR	AI Interrupt Lower Limit Net PV ch3	FFFFADF8	INTEGER32	RW	
	04h	VAR	AI Interrupt Lower Limit Net PV ch4	FFFFADF8	INTEGER32	RW	
9145		ARRAY	AI Interrupt Upper Limit Net PV		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Upper Limit Net PV ch1	0001D4C0	INTEGER32	RW	
	02h	VAR	AI Interrupt Upper Limit Net PV ch2	0001D4C0	INTEGER32	RW	
	03h	VAR	AI Interrupt Upper Limit Net PV ch3	0001D4C0	INTEGER32	RW	
	04h	VAR	AI Interrupt Upper Limit Net PV ch4	0001D4C0	INTEGER32	RW	
9148		ARRAY	AI Span Start		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Span Start ch1	FFFFADF8	INTEGER32	RW	
	02h	VAR	AI Span Start ch2	FFFFADF8	INTEGER32	RW	
	03h	VAR	AI Span Start ch3	FFFFADF8	INTEGER32	RW	
	04h	VAR	AI Span Start ch4	FFFFADF8	INTEGER32	RW	
9149		ARRAY	AI Span End		INTEGER32		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	AI Span End ch1	0001D4C0	INTEGER32	RW	
	02h	VAR	AI Span End ch2	0001D4C0	INTEGER32	RW	
	03h	VAR	AI Span End ch3	0001D4C0	INTEGER32	RW	
	04h	VAR	AI Span End ch4	0001D4C0	INTEGER32	RW	

* The factory set (value present in the modules when new) for the transmission type is: **01h**.